REFERENCES.

New 1 inch Ordnance Map, Sheet 270.
Geological Survey Map, Sheet 8.
1872. WHITAKER, W.—"Geology of the London Basin." *Mem. Geol. Survey.*
1886. FRENCH, H. H.—Excursion to Cheam, Ewell, and Epsom. *Proc. Geol. Assoc.*, vol. ix., p. 532.
1889. WHITAKER, W.—"Geology of London." Vol. i, pp. 5, 109, 126, 241, 489, *Mem. Geol. Survey.*

## EXCURSION TO ORPINGTON.

SATURDAY, JUNE 15TH, 1901.

*Directors:* T. V. HOLMES, F.G.S., and C. W. OSMAN, A.M.I.C.E.

*Excursion Secretary:* E. W. SKEATS, B.Sc., F.G.S.

(*Report by* T. V. HOLMES.)

THE object of this excursion was to obtain another view of the sections exposed at the north of Orpington railway station during the widening of the line.

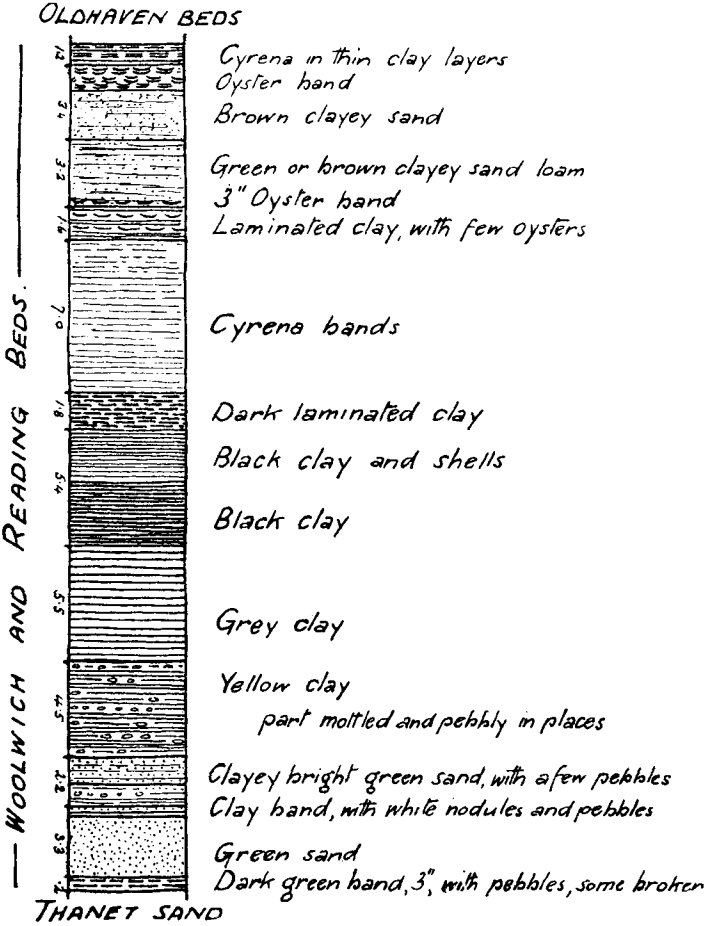
When these sections were visited in September, 1900, the Thanet Sand was clearly shown close to the railway station, and the shell beds of the Woolwich series were exposed only at, and four or five feet above, the level of the line east of Place Farm. On this occasion the Thanet Sand was hidden by fallen material, but the Woolwich Beds were admirably shown. Standing on the eastern bank of the cutting, where a footpath crosses the line, nearly midway between the railway station and the north-western corner of Clay Wood, the party obtained an excellent view of the Woolwich Beds on the opposite side. As quoted in the report of the previous Orpington excursion, in September, 1900, Mr. Whitaker, in "The Geology of London, and of part of the Thames Valley," says of this cutting that it must have given a fine section *when clear.* On this occasion, after a few general remarks from Mr. Holmes and the President, Mr. Osman unfolded a carefully drawn and elaborate section showing the details of the various beds exposed in the cutting during the widening, the result of his observations as engineer. The party then descended to the western side to note the characteristics of the various strata. The variegated clays seen at Cheam and Ewell on the previous Saturday were almost entirely absent, and were represented by bands of dark or even black clay. The diagram prepared from Mr. Osman's drawings, however, obviates the necessity of noting the details in writing. (Fig. 14.)

A few yards south of the bridge over the line, between Crofton Court and Clay Farm, the party stopped to examine some curious surface contortions in the side of the cutting, which was there only six or seven feet deep. Some discussion

FIG. 14.—THE ORPINGTON CUTTING.

(After C. W. Osman.)

*Thicknesses given in feet and decimals.*




arose as to how far they were probably due to changes resulting from the dissolution of shells, the spread and decay of the roots of trees, or the former existence of a stream at the spot where they were seen. Then some trucks fitted with seats, which had

been kindly provided by the contractors, Messrs. J. Aird and Sons, whose representative, Mr. Townsend, was present, bore the party through the London Clay in the Towncourt Wood cutting to a spot a few yards south of the L.C.&D.R. line. Here the junction between the London Clay and the underlying sand of the Oldhaven Beds was seen. Remounting the trucks, the party then proceeded to Chiselhurst railway station.

REFERENCES.

Geological Survey Map, Sheet 6. Price 8s. 6d.
Ordnance Survey Map (New Series), Sheet 271. Price 1s.

1889. WHITAKER, W.—"Geology of London." Vol. i. *Mem. Geol. Survey.*
1900. HOLMES, T. V.—Excursions to Grove Park and Orpington. *Proc. Geol. Assoc.*, vol. xvi, pp. 522, 533.

## EXCURSION TO HEATHFIELD AND BRIGHTLING.

SATURDAY, JUNE 22ND, 1901.

*Director:* CHARLES DAWSON, F.S.A., F.G.S.
*Excursion Secretary:* E. W. SKEATS, B.Sc., F.G.S.

(*Report by* THE DIRECTOR.)

THE party arrived at Heathfield about one o'clock, and were met by Mr. Dawson, who at once conducted them to the site of the celebrated "Natural Gas" well. Here sections and plans were shown of the strata traversed by the boring. The Director, after giving a short description of the strata over which the party had passed in travelling from London, indicated upon a geological map the proposed route for the day, showing that during their journey they would cross and recross all the beds lying between the Tertiaries and the Lower Purbecks. He then gave a short account of the discovery of the "Natural Gas," the full details of which have already appeared in the *Quarterly Journal of the Geological Society* (Vol. LIV. (1898), pp. 564-571). The gas has now been used by the L.B. & S.C.R. Co. to light their station and offices at Heathfield for two years, and such is its purity that several of the Welsbach mantles originally employed still remain uninjured. A number of syndicates are now negotiating for its further development.

The party then entered the carriages awaiting them, and proceeded along the Wealden anticlinal in the direction of Brightling Beacon. Near the Crown Inn at Heathfield the anticlinal bifurcates, one limb running N.E. and the other S.E. In the valley between these two branches are exposed by upheaval and denudation the lowest layers of the Wealden formation (Ashdown Sands and Fairlight Clays) and the Purbeck Beds. Taking the road along the top of the S.E. anticlinal, the party eventually reached Dallington. Here the route struck across the strata lying between the two anticlinals. The highest point reached was Brightling Beacon, and at the Observatory the party descended from the vehicles to enjoy the magnificent view commanded